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14. ABSTRACT
This quarterly report describes the work done for the "Passive Imaging System for Measuring Atmospheric Scattering and CFLOS", under ONR Contract N00014-07-1-1060, between 1 May 2008 and 31 July 2008.

15. SUBJECT TERMS
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University of California, San Diego
JTO/ONR HEL MRI Quarterly Report July 2008

Project Title: Passive Imaging System for Measuring Atmospheric Scattering and CFLOS
Grant Number: N00014-07-1-1060

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1. **Activities for Current Quarter, May 08 – July 08**

Task 1: (Experimental test site)

The Scanning MSI system has been running since March 3. We have ordered new filters, as the data analysis indicated a problem with the blue filter. Also, there is a slight noise problem, and we have recently received new hardware on another program that should help us diagnose this.

Two transmissometers were installed by the MIT group on this contract, during May 12 – 16. These transmissometers acquire data in the visible and short wave IR. They appear to be operating well. We need to do more tests to determine whether variations in signal are accurately reflecting the atmosphere, or whether they are also impacted by the wooden floor of the trailer.

All systems are continuously acquiring data, and are checked every week. We gave the sponsors a tour of the site on 26 June.

Task 2: (Weather at test site)

The ground weather station installed by the NPS team in Feb, and the Vaisala Point Scatter Meter installed by UCSD in early March, continue to operate well. The buoy planned for deployment in Year 2 by NPS was seriously damaged in a "hit and run" accident on 5 May. Under highly leveraged funding, the NPS team has purchased the necessary new components, and is working to refurbish the buoy. Prior to the accident, the buoy was deployed, under other funding, near our path of sight, and we may also be able to use that data.

Task 3: (Purchase IR system components)

We have been evaluating the best IR camera to purchase for our needs and budget, and hope to close on this and place the order soon.

Task 4: (Data analysis)

In addition to the data analysis from the previous quarter that isolated the measurement issues mentioned under Task 1, we have evaluated transmissometer data. We have a new employee starting 4 August, who will be helping with the data analysis.

Task 5: (Visibility algorithm)

We realized that if we can use ocean radiance below the horizon, these will be at closer range, and thus give us a better range of visibility conditions. For this reason, we began researching the accuracy of inertial navigation systems. It appears they will be accurate enough to enable this feature.

(Tasks 6, 7, and 8 are not funded for year 1)

Task 8: (Research military needs)

On a not-to-interfere basis, we have explored various options for building a scanning MSI system without using a large rotary table, as this should better meet military needs for compactness and robustness. We have also researched the availability of lidar systems, to help us in experiments to extend the MSI capabilities to non-horizontal paths.

2. **Events**

We attended the JTO meeting in Albuquerque on May 7, and gave a presentation which was well received. We met with the sponsor on 26 June, and gave them a tour of the experimental site.

3. **Technical Results/Accomplishments**

Task 1: (Experimental test site)

The MSI and the two transmissometers have been deployed and are successfully running at the experimental test site.

Task 2: (Weather at test site)

The ground weather station and the Vaisala point scatter meter have been deployed and are running successfully.

Task 3: (Purchase IR system components)

Task 4: (Data analysis)

Initial data assessment indicates data are reasonable, with some issues to be addressed.

Task 5: (Visibility algorithm)

We have determined that use of data below the horizon should further extend the anticipated visibility ranges over which the MSI might be expected to operate.

Tasks 6, 7, and 8 are not funded for year 1

Task 8: (Research military needs)

We have determined that the inertial navigation systems commonly available on Navy ships should provide the required accuracy for the scheme mentioned in Task 5.

4. **Issues**

There are no issues we are aware of at this time. We are 3 months behind our original spending projections, due to delays in receipt of funds, but this does not appear to present a problem.

5. **Activities for Upcoming Quarter: (May 08 – Jul 08)**

Task 1: (Experimental test site)

We expect to run further tests on the transmissometers, to determine whether there is a stability problem or not, replace the blue filter on the MSI, and diagnose and fix the minor noise problem on the MSI. Ongoing monitoring of all system will continue.

Task 2: (Weather at test site)

Ongoing monitoring of systems will continue.

Task 3: (Purchase IR system components)

We plan to complete evaluation of the best camera and lens to order for the Short Wave IR imaging system, with the goal of deploying the instrument in the second year.

Task 4: (Data analysis)

We will continue to evaluate the field data, to determine whether flux levels are optimal, and whether general data quality is optimal.

Task 5: (Visibility algorithm)

We hope to begin analysis of inherent contrast and its behavior with respect to solar angles and other parameters.

Tasks 6, 7, and 8 are not funded for year 1

Task 8: (Research military needs)

6. Cost Report

The cost report will be sent by 10 August.

7. Milestone Status

The milestone for this year has been completed. Our original milestone was to have the experimental site fielded in January 2008. This milestone was moved to February after the start of the contract, because the funding was in place on 3 August, rather than 1 July. Although the instrument was ready at the end of February, it was actually deployed 3 March, because the delivery truck we had planned to use broke down.

8. Summary

The milestone for Year 1 has been accomplished, with the fielding of the experimental site. Although fielding of transmissometers was not included in the proposal, we were asked by the proposal review team to include this work. This has been completed. The instruments are working well. We plan to continue supporting the field site, and continue with data analysis and IR system design in the next quarter. We believe we have made good progress. We are on track for schedule, and slightly slow in funding, due to delays in receipt of the funds.